REMARKS

This communication is responsive to the Office Action mailed on October 19, 2004. No claims are amended, no claims are canceled, and no claims are added. As a result, claims 20, 22, 24, 26, 28, 32, 34, and 37 are now pending in this Application. If the Examiner is not convinced that the pending claims are in condition for allowance after reviewing this document, the courtesy of an Examiner's Interview is respectfully requested prior to preparing and mailing any Final Office Action.

§103 Rejection of the Claims

Claims 20, 22, 24, 26, 28, 32, 34 and 37 were rejected under 35 USC § 103(a) as being unpatentable over Obata (U.S. 5,222,203). The Applicant does not admit that Obata is prior art, and reserves the right to swear behind this reference in the future. And, since a *prima facie* case of obviousness has not been established as required by M.P.E.P. § 2142, the Applicant respectfully traverses this rejection.

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988). The M.P.E.P. contains explicit direction to the Examiner in accordance with the *In re Fine* court:

> In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d (BNA) 1438 (Fed. Cir. 1991)).

The requirement of a suggestion or motivation to combine references in a *prima facie* case of obviousness is emphasized in the Federal Circuit opinion, *In re Sang Su Lee*, 277 F.3d 1338; 61 U.S.P.Q.2D 1430 (Fed. Cir. 2002), which indicates that the motivation must be supported by evidence in the record.

No proper *prima facie* case of obviousness has been established because none of the required elements has been demonstrated, that is: (1) the reference does not teach all of the limitations set forth in the claims; (2) there is no motivation to modify the reference; and (3) modifying the reference as suggested by the Office provides no reasonable expectation of success. Each of these points will be explained in detail, as follows.

The Reference Neither Teaches Nor Suggests All Limitations: First, with respect to claim 20, Obata does not teach the elements of "selecting a mode, the mode is FRONT_ONLY, BOTH_SIDES, or BACK_ONLY; determining a viewing angle; determining an object angle; calculating a theta, theta equals the viewing angle minus the object angle plus pi; assigning a function of theta to alpha, if the mode is FRONT_ONLY or BOTH_SIDES; assigning a function of theta minus pi to alpha, if the mode is BACK_ONLY; comparing alpha to zero; assigning zero to alpha, if the mode is FRONT_ONLY and alpha is less than zero; assigning zero to alpha, if the mode is BACK_ONLY, and alpha less than zero; assigning minus alpha to alpha, if the mode is BOTH_SIDES, and alpha is less than zero; and assigning a transparency factor to alpha."

The Office asserts that "Obata teaches selecting a mode, the mode is FRONT_ONLY, BOTH SIDES, or BACK-ONLY (Depending on the relationship among the viewpoint vector, the light source vector and the normal vector of the object surface, FRONT-ONLY, BOTH SIDES, or BACK-ONLY is judged; column 7)..." It is respectfully noted that Obata does not recite a "mode" in col. 7. Even if Obata did recite a mode, however, the Office admits that the mode "depends on the relationship among the viewpoint vector, the light source vector, *and* the normal vector..." [emphasis added]. Since the mode in claim 20 does not depend on a light source vector sub-element, by extension the Office admits that a "mode" that might be inferred from Obata col. 7 is different from the mode claimed by the Applicant in claim 20.

The Office further asserts that Obata teaches "determining a viewing angle (let the angle of the opposite light source vector –VL with respect to the reference x-axis of an arbitrary reference frame be denoted by va_alpha), determining an object angle (the angle between the normal vector of the object surface with respect to the reference x-axis of an arbitrary reference frame; denoted by oa_beta), calculating a theta, theta equals the viewing angle minus the object angle plus pi (the angle between the normal vector VN and the light vector VL is the angle theta = pi – oa_beta + va_alpha; column 7), assigning a function of theta to alpha, if the mode is

FRONT ONLY or BOTH-SIDES (the alpha being the cosine function of theta; see column 6), assigning a function of theta minus pi to alpha, if the mode is BACK ONLY (cosine(va_alpha - oa_beta) = cosine |va_alpha|+|oa_beta|); column 6-7); comparing alpha to zero; assigning zero to alpha, if the mode is FRONT ONLY and alpha is less than zero (in this case, the inner product between the normal vector of the object surface and the light source vector or cosine(pi - oa_beta+va_alpha) should be positive; column 6-7); assigning zero to alpha, if the mode is BACK ONLY, and alpha less than zero; assigning minus alpha to alpha, if the mode is BOTH-SIDES, and alpha is less than zero (column 6-7)."

It is respectfully noted that claim 20 contains no light source vector (relied upon by the Office above); and Applicant can find no reference in Obata col. 6-7 to va_alpha or to oa_beta, as cited by the Office. Additionally, the Office provides no explanation for its assertion that Obata recites claim 20 elements "assigning zero to alpha, if the mode is BACK_ONLY, and alpha less than zero"; and "assigning minus alpha to alpha, if the mode is BOTH_SIDES, and alpha is less than zero." Thus it appears that the Examiner is using personal knowledge as a basis for these assertions, and an affidavit is respectfully requested as required by 37 C.F.R. § 1.104(d)(2). The Applicant also respectfully requests that, in the interest of clarity and effective communication between the Office and the Applicant, the Office recite the elements taught by Obata using specific line references to Obata (or Obata's element reference numbers), so that the Applicant may easily differentiate those elements asserted as taught by the reference, and those which are not.

Second, with respect to claims 22, 26, and 32, the Office asserts that "Obata discloses identifying a vector normal to a viewing surface (e.g., identifying a light vector on the same side or at the same direction of the viewing surface being normal to a viewing surface; column 6-7) and incident at an object having an object surface (the image object having an object surface; Figs. 2, 8 and 10), the vector creating an angle of incidence at the object surface (col. 6-7), and modulating the transparency of an image of the object as a function of the angle of incidence of the vector at the object surface (col. 6-7), wherein the function comprises a cosine function (col. 6-7; Figs. 2, 8 and 10)."

The Applicant is unable to find any reference to "identifying a vector normal to a viewing surface" as cited by the Office to Obata, col. 6-7. Neither can Applicant find "modulating the

transparency of an image of the object as a function of the angle of incidence of the vector [normal to a viewing surface and incident to the object surface] at the object surface" or "wherein the function comprises a cosine function" in the citations referenced by the Office. Furthermore, the Office offers no explanation how information in the latter two citations might suggest the referenced sub-elements of Applicant's claims 22, 26, and 32. Thus it appears that the Examiner is using personal knowledge as a basis for these assertions, and an affidavit is respectfully requested as required by 37 C.F.R. § 1.104(d)(2). Again, the Applicant respectfully requests that the Office recite the elements taught by Obata using specific line references to Obata (or Obata's element reference numbers).

Third, with respect to claims 24, 28, 34, and 37, the Office asserts that "the limitation of claims 24, 28, 34, and 37 are identical to claims 22, 26, and 32 above. Therefore, claim 26 is treated with respect to the same grounds set forth for claims 22, 26, and 32 above, except for the function comprises a non-linear function (col. 6-7). In other words, Obata discloses a cosine function of theta. The cosine function is a non-linear function."

The Applicant respectfully points out that no reference can be found in col. 6-7 to "a non-linear function." Although a cosine function is a non-linear function, the cosine function recited in Obata (of an angle between a light vector and an object normal vector) is a function of a different angle than that claimed by the Applicant (the angle between a viewing normal vector and an object normal vector). Therefore, as to claims 24, 28, 34, and 37, Obata col. 6-7 does not "teach or suggest all the claim limitations," as is required to establish a prima facie case of obviousness.

No Motivation to Modify the Reference: Several assertions are made in the Office Action, as follows:

1) "In other words, Obata discloses a method for displaying a translucent object or an opaque object on a display screen comprising a step of displaying a translucent object by calculating the color intensity. The color intensity comprises an ambient light component and the diffused transmitted light component, which is in relation to an angle made between a normal vector of the object surface and a light source vector as being at normal to the light surface, the diffused transmitted light coefficient, and the intensity value corresponding to the light source. The angle of incidence of the incident light source being over the range 0 to pi, so that the object

develops its own color intensity on the basis of the diffused transmitted light coefficient Ktr, the intensity value corresponding to the incident light from a light source. The intensity or brightness of the image object is described by the color and/or transparency values. However, Obata does not specifically teach the claim limitation of "assigning a transparency factor to alpha... Obata suggests the claim limitation of 'assigning a transparency factor to alpha' in column 1 and 6-7 wherein Obata teaches that, the actual display color of the image object is determined by **mixing the color of the object and the color of background,** based upon the transmissivity of the translucent object (column 1)."

The Office references terms from Obata that are non-analogous to those used in the Application, with no explanation for why the analogy applies. The Application makes no mention of an "incident light source," a "diffused transmitted light coefficient," the "color of the object," the "color of the background," or a resultant display color of the image object. The Office does not provide a citation to any suggestion in Obata for modifying Obata's color intensity calculation derived from the relative angles of impinging light sources to yield object transparency as a function of the viewing angle calculation in the application. Claim 20 does not address color intensity, but rather a mode selection clarified by Applicant's specification to include a transparency factor, calling for opacity of a *displayed* image ("image to be viewed"; see Application, page 2 lines 26-27) when a surface of a displayed object is perpendicular to a viewing vector.

As the Office acknowledges, Obata does not teach the claim limitation of "assigning a transparency factor to alpha." The Office provides no explanation for its assertion that Obata suggests the claim limitation of 'assigning a transparency factor to alpha' in column 1 and 6-7 wherein Obata teaches that, the actual display color of the image object is determined by **mixing the color of the object and the color of background,** based upon the transmissivity of the translucent object (column 1)." It is clear from Obata that the "transparency" taught therein is not a *modulating output* of the Obata method/apparatus, as described in the Application, but is rather a characteristic of the material from which the object to be displayed, that is, an *input* to the Obata method/apparatus:

> The diffused transmitted light component may be calculated based upon a coefficient which is a function of the characteristics of the material forming the translucent

> object, the intensity of incident light from the light source and the angle of incidence of the incident light for illuminating the translucent object. *The characteristics of the material include its transmissivity and its transparency*" Obata col. 2, lines 25-33 [emphasis added].

See also Obata col. 1, lines 12-17, "[a] method and an apparatus suitable for realistic [sic] displaying an object which is not perfectly opaque and which has a fairly low transparency such as frosted glass, paper and the like, by a graphics display apparatus." The Applicant can find no motivation in Obata or in the arguments set forth by the Office to modify the material characteristics in Obata resulting in color mixing of the displayed object to obtain the transparency factor recited in claim 20 of the application as a function of the viewing angle relative to the object face. Thus it appears that the Examiner is using personal knowledge as a basis for these assertions, and an affidavit is respectfully requested as required by 37 C.F.R. § 1.104(d)(2).

2) "Obata teaches that, by appropriately setting the coefficients associated with the intensity components, the display of an opaque object or a translucent object can be controlled in such a way that an opaque object can be displayed by providing a zero value output from the diffused transmitted light component and a translucent object can be displayed by providing zero value outputs from the diffused reflection light component and the specular reflection light component (column 7) wherein the background object is displayed as blurred to obtain a superior realistic display (column 6). In the case for translucent image object, the intensity of the image object is governed by the Itr component and therefore Itr determines the transparency factor. The translucency or transparency of the image object is determined by a number of the input parameters such as the diffused transmitted light coefficient and reflection coefficient of ambient light. The transparency is zero for an image object to be displayed as an opaque object after setting the coefficients associated with the intensity components or parameters. The intensity of the diffused transmitted light greatly varies in accordance with the angle theta made between the normal vector of the object surface and the light source vector as being normal to the light source surface. The angle theta is usually 0 to pi, and theta = pi signifies the case that the object surface is at a position opposite to the light source, whereas theta = 0 means the case that the object surface is in a parallel and opposed relation to the light source so that it is in the most bright condition. Therefore, according to the teaching of Obata, it would have been obvious to assign a

transparency factor to alpha. Doing so would enable the modification of the color of the object by **mixing the color of the object and the color of background.**"

The Applicant respectfully notes that the Office repeatedly admits in the paragraph above that the opacity and translucency mentioned in Obata are functions of various light source vectors and their respective angles relative to the object normal vector. As the Applicant's specification makes clear, however, transparency as taught in the Application is based upon the *viewing* vector relative to the object normal vector. The Office neither explains nor cites to an explanation in Obata for the Office's assertion that the light source vectors in Obata suggest or provide a motivation to modify Obata to obtain the viewing vector in the application. Thus it appears that the Examiner is using personal knowledge as a basis for these assertions, and an affidavit is respectfully requested as required by 37 C.F.R. § 1.104(d)(2). Again, the Applicant respectfully requests that the Office recite the elements taught by Obata using specific line references to Obata (or Obata's element reference numbers).

3) "Re claims 22, 26, 32, Obata discloses identifying a vector normal to a viewing surface (e.g., identifying a light vector on the same side or at the same direction of the viewing surface being normal to a viewing surface; column 6-7) and incident at an object having an object surface (the image object having an object surface; Figs. 2, 8 and 10), the vector creating an angle of incidence at the object surface (col. 6-7), and modulating the transparency of an image of the object as a function of the angle of incidence of the vector at the object surface (col. 6-7), wherein the function comprises a cosine function (col. 6-7; Figs. 2, 8 and 10). In other words, Obata discloses a method for displaying a translucent object or an opaque object on a display screen comprising a step of displaying a translucent object by calculating the color intensity."

As previously noted, the Applicant is unable to find any reference to "identifying a vector normal to a viewing surface", "modulating the transparency of an image of the object as a function of the angle of incidence of the vector [normal to a viewing surface and incident to the object surface] at the object surface," or "wherein the function comprises a cosine function" in the citations referenced by the Office (i.e., in Obata, col. 6-7). Furthermore, the Office offers no explanation how any information in the latter two citations might suggest a motivation to modify Obata to obtain the referenced sub-elements of Applicant's claims 22, 26, and 32. Thus it

appears that the Examiner is using personal knowledge as a basis for these assertions, and an affidavit is respectfully requested as required by 37 C.F.R. § 1.104(d)(2).

4) "Re claims 24, 28, 34, and 37, the limitation of claims 24, 28, 34, and 37 are identical to claims 22, 26, and 32 above. Therefore, claim 26 is treated with respect to grounds as set forth for claims 22, 26, and 32 above except for the function comprises a non-linear function (col. 6-7). In other words, Obata discloses a cosine function of theta. The cosine function is a non-linear function."

As previously noted, the Office provides no explanation for its assertion that the cosine function recited in Obata teaches or suggests the non-linear function in claims 24, 28, 34, and 37. Furthermore, the cosine function recited in Obata (of an angle between a light vector and an object normal vector) relates to a different angle than that of the application (the angle between a viewing normal vector and an object normal vector). The Office provides no reference to any suggestion in Obata or otherwise for a motivation to modify the angle of incidence between a light vector and the displayed object vector in Obata to obtain the angle between "a vector normal to a viewing surface and incident to an object having an object surface" in the application. Therefore, as to claims 24, 28, 34, and 37, Obata col. 6-7 provides no "suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings" as is required to establish a prima facie case of obviousness.

No Reasonable Expectation of Success: It is respectfully noted that the test for obviousness under § 103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *See Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 U.S.P.Q. 543, 551 (Fed. Cir. 1985) (emphasis added). References must be considered in their entirety, including parts that teach away from the claims. See MPEP § 2141.02. Where a *single* reference is cited, and that reference does not include one or more elements of the rejected claim, the Applicant asserts that no reasonable expectation of success can properly be found based upon the missing element(s).

Simple example to demonstrate non-obviousness. If one holds a sheet of copy paper up to an office light or to a window, with the sheet face perpendicular to the person's viewpoint, the transparency of the paper can be noted. If the sheet is slowly rotated so that the sheet face is

less perpendicular to the viewpoint, it can be noted that transparency *decreases* as the sheet is rotated away from the perpendicular position. Repeating this example in the different types of light recited in Obata displays the effect that is clearly the stated objective in Obata, *realism*. "It is an object of the present invention to obtain a visual display with superior realistic appearance..." Obata col. 2, lines 3-4.

In contrast, displaying the sheet of paper perpendicular to the viewpoint according to embodiments recited in claims from the Application results in maximum *opacity*; and transparency *increases* as the sheet is rotated away from the perpendicular. By yielding an opposite displayed result through embodiments designed to accomplish a completely different purpose (realism versus Applicant's artificial construct), Obata teaches away from the embodiments claimed.

In summary, the reference neither teaches nor suggests the elements of claims 20, 22, 24, 26, 28, 32, 34 and 37. No evidence in the record supports a suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to achieve the claimed embodiments, particularly in view of Obata's teaching away from the Applicant's invention. Thus, no reasonable expectation of success results; the requirements of *M.P.E.P.* § 2142 have not been satisfied; and a *prima facie* case of obviousness has not been established with respect to the Applicant's claims. It is therefore respectfully requested that the rejections to claims 20, 22, 24, 26, 28, 32, 34 and 37 under 35 U.S.C. § 103 be reconsidered and withdrawn.

CONCLUSION

The Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. As noted above, if the Examiner is not convinced that the pending claims are in condition for allowance after reviewing this document, the courtesy of an Examiner's Interview is respectfully requested prior to preparing and mailing any Final Office Action.

The Examiner is invited to telephone the Applicant's attorney Mark Muller 210-308-5677, or the below-signed attorney at (612) 349-9592, to facilitate prosecution of this Application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 20th day of December 2004.

Chris Hammond
Name

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